

# Graphics Tips: Principles for Good Graphics Design

while not exhaustive, the following tips are helpful for constructing effective graphics. Those who consider them will be well on their way to creating good graphics.

Remember that most of us will improve our graphics techniques largely through trial and error. We will **try**, evaluate the result, and **try** again. Through the process of trial and error, we will discover what works and what does not. Also, by scrutinizing the mistakes or successes of others, we can learn with less pain.

Each graphics software program has numerous options; these small touches often make the difference between an adequate graphic and an exceptional one. For this reason, we need to consider the following when constructing graphics:

## *General Tips on Graphics Design*

- ▶ Do not omit any information from a graphic simply because the information is included in the accompanying text of the report; everything required to interpret the graphic should appear somewhere on the graphic.
- ▶ Avoid wrapping text around a graphic unless there is a clear purpose in doing so (e.g., the graphic is very small). Rarely would wrapping text be needed in an OEI report since graphics are usually limited in number and big enough to restrict the effective use of text wrapping around the graphic. While this guide makes considerable use of wrapping text, this was done with the purpose of limiting the amount of space taken up by a large number of graphics.
- Select shading patterns carefully. Your choices won't make a poorly designed graphic better, but they can detract from an otherwise good graphic. The wrong combination of patterns can create optical illusions that make most straight lines appear crooked. If the purpose of your graphic is to prove a point or influence a decision, bear in mind that a darker shade, or a brighter color, tends to stand out. For example, the portion of a pie chart you want to emphasize should be the darkest.
- ▶ Provide additional precision *when necessary*. For many graphics, the viewer does not need precise values for the data points. However, sometimes more precision is needed. To add precision we can 1) add specific values for important data points, 2) provide a full data table with the graphic, and/or 3) provide a grid to enable the viewer to easily look up needed values.
- ▶ Clearly indicate when values rise above (or dip below) an important threshold. Three ways to highlight such a threshold are 1) adding a pointer/marker, 2) adding a reference line, or 3) shading the important part of the graph.

- Use paired graphics to explain more fully related findings. For example, rather than put multiple lines on the same graphic, splitting the information between paired graphics *can* make multiple trends easier to interpret.
- ▶ Do not use scales carelessly. Often several different scales can be used. However, avoid the temptation to choose scales which do not fairly depict the data portrayed. It would not be ethical to do so.
- Consider using two different vertical axes (two Y-axes) in the same graphic to compare two trends which could otherwise not be compared on one scale.
- Use properly spaced scales. Specifically, do not change the interval width arbitrarily. For example, it would be misleading to start a scale with intervals of 1 and when a certain point **was** reached the intervals change to 10. **This** will distort the graphic. Fortunately, most presentation graphics programs only allow the user to choose one scale per axis.
- Unless paired with a second, full-scale graphic, generally avoid using partial scale breaks in most cases. For example, you are graphing data and one bar is so much larger than the other bars that it is difficult to discern any trends with the other bars since they are so small. You might be tempted to simply slice a portion of the large bar away using a break so that the trends depicted by the smaller bars are more apparent.
- Incorporate the data themselves directly into the graphic if they will have impact. In this type of graphic, data points are replaced with the actual numeric values.
- Use adjusted or corrected raw data. Using unadjusted or uncorrected data may convey a misleading impression.
- ▶ Provide proper comparisons in order to put the data into the proper perspective. **This** simply means you should provide the reader enough information to make their own decisions. **For** example, you might be inclined to graph only data for two years which showed an increase in sanctions for a particular State. However, it would be more fair to graph a larger span of time if decreases occurred prior to or after these years. Additionally, the two year increase could have existed in several other States. If knowing this additionally information would affect the reader's interpretation of the information provided, it should be included.
- ▶ Do not use three-dimensional (3-D) graphics gratuitously. Adding a third dimension can often make a graphic more appealing and more likely to be viewed carefully. However, 3-D also distorts images and can give a viewer a false perception.
- Resist the temptation to overuse a graphics program's many options (e.g., font styles, shading patterns).

- Add color to graphics for important oral briefings (e.g., slides, transparencies, flip charts). However, color should rarely be used in inspection reports because readers will often read copies of the original report which are in black and white. If color is required, ensure when the color graphic is copied on a non-color copier that the graphic still portrays its message without distortion.

Colors can be used to distinguish one category from another (in a pie chart), to symbolize reality (green for savings or red for losses in a deviation column chart), to emphasize certain data (segments of a deviation bar chart indicating unacceptable performance), to identify a recurring theme (each time staff have been added), or simply to enliven the graphic to make it more readable. Colors found in nature (light blue, yellow, gray) often work best, especially along with strong primary colors for emphasis. Remember that color graphics are expensive and take time to produce. *Also*, be aware that some people can't distinguish red or green very well.

- If the graphics program used produces a border, use WordPerfect's user-defined graphics option rather than the graphics figure option when importing such a graphic into WordPerfect (or change the options for the figure to include no border). Otherwise, you will get a double border surrounding the graphic.
- Save **good** graphics designs as templates. A template for major graphics types will save you time and help you create attractive, consistent graphics without having to make basic design decisions each time you create one. Many graphics programs already come with templates for selected types of graphics (e.g., DrawPerfect comes with 24 drawing templates you can use as models or as the basis for your own work). Some even include clip art.
- When you see a good graphic, copy and save it in a folder. This may come in handy one day when you need to graph similar types of data.

### ***Tips for Specific Types of Graphics***

#### **• Pie Charts**

Use percentage figures in developing the pie chart. While most presentation graphics programs can convert numbers to percentages, it is a good habit to use percentages.

The most important elements should start at the 12 o'clock position on the pie and progress clockwise, with each subsequent slice a lighter color or shade of grey. Avoid the moire effect by not using too many **types** of hatching patterns; various shades of grey are preferable. If you must use hatch patterns, stick to simple ones and avoid those which clash or create distortion.

Try to limit the number of pie slices per pie to **six**. If several slices are very small, they can be especially difficult to interpret. If you have too much data, eliminate the least important slices or combine the smallest slices into a single category labeled "Other."

Use a legend for annotating several pies on a page with common descriptions. This avoids repeating the labels on each pie and gives a cleaner look to the page.

- **Line Charts**

Use multiple-line charts to compare the trends of several items. Distinguish lines by using different *line* styles or widths. Remember, more than three or four lines *can* make a graphic confusing, especially if the lines **cross**. One remedy discussed previously is to break your data up into **two** charts and place them both on the same page.

- **Area Charts**

Consider other graphics options when stacked areas become jagged-looking and **hard** to interpret as a consequence of extreme swings in the data and the lack of a common baseline. Use a clustered bar chart if you want to compare data sets against a common baseline. Use a segmented bar chart if you want to stack areas in a different form.

Place bands (filled in area) from bottom to top in a logical progression. One method is to place the bands in order of significance. Since the bottom band is easiest to interpret and is usually the darkest, the most significant band would be placed there. Another method, providing the easiest overall interpretation, is to place the most stable band on the bottom and work up through the less stable bands.

- **Deviation Bar Charts**

Arrange the positive values in descending order and the negative in ascending order.

- **Segmented Bar Charts**

Make sure the segments of a bar add up to a meaningful total (e.g., 100 percent of something). Use a clustered bar chart to display several items that are not parts of a meaningful whole.

- **Histograms**

Choose the right numeric intervals when constructing a histogram. In general, choose at least five intervals and no more than 20. Too few or too many intervals will obscure the *pattern* of distribution.

- **Paired Bar Charts**

Although the left and right axes of a paired bar chart can have separate scales, try to use the same scale for both. If you do use separate scales, try to scale them so that the longest left bar is close to the same length as the longest right bar.

- **Bubble Charts**

Use no more than eight bubbles in a single *chart* for maximum effectiveness.

- **Text Charts**

Use lowercase letters for readability.

~~Use~~ borders for a polished look.

Use a minimum ~~of~~ words per line and a minimum number of lines per chart.

Double space text if the text size is small.

Use italics, not capitals, to emphasize a letter or word.

Use text sizes no smaller than eight in reports and no smaller than 10 in slides or flip charts, to ensure readability.

# Graphics for Oral Briefings

Graphics which **are** appropriate and helpful in a written report **are** not always appropriate or helpful for an oral briefing. In fact, using the same graphics as in a report **can** sometimes **harm** a briefing. The graphics in a written report **are** analogous to magazine advertisements. A viewer can study each graphic as long as necessary and when return time and again to check the details. But graphics for a briefing are more like billboards by the highway. A viewer has only one, brief chance to grasp the message **as** it flashes by.

One expert recommends that our briefings use graphics "twice as simple and four times as bold" as those we use in our reports. Briefings **are** not the time for graphics requiring careful, detailed study. We should simplify our graphics in briefings and refer the audience to more detailed graphics for additional information.



## *Planning for the Briefing*

When planning a briefing, the first question may well be not "what visuals are needed?"; it may be "are any needed at all?" The answer may be no. There are, after **all**, some disadvantages to visuals; they 1) may take a lot of time and thought, 2) can divert attention away from what we are presenting, 3) may diminish flexibility, 4) may cost money, and 5) if the visuals are poorly done, the result can vary from audience confusion **to** dissatisfaction.

Having said that, it remains true that a picture is worth a thousand words. Most briefings are improved, and many **are** transformed, by good use of graphics. They instantly and vividly portray things which may be inefficient to convey verbally. For the audience, graphics save time, create interest, add impact, and most importantly, remain in the audience's memory long after the words have gone.

If **you** decide to use graphics for a briefing, think about them **from** the very start of your briefing preparation. Do not finish your briefing script and then say "Now where should a graphic **go**?" From the beginning, begin asking yourself "What message do I want to lodge in the minds of the audience?"

## ***Briefing Chart Traps***

### **• Using Too Many Words**

It is easy to use too many words in a briefing chart. There is less danger if the graphic is used as a handout and the most danger if the graphic is a slide. Whether the words are used to identify parts of a graphic or describe information such as stages in a process, their intended **task** will fail if there are too many words. The audience is either 1) deterred from reading them or 2) fails to listen to the speaker because they **are** following the eye-words at the expense of the ear-words. Especially for a large audience, visuals (slides, transparencies, large flip charts, etc.) do not have to be self-explanatory and are often more effective if they cannot be fully understood until the speaker identifies and explains the picture. It is a support, not a substitute, for the presenter. The effect of the graphic is often increased if we bring it to life and breathe meaning into it as we take an audience through it. It is acceptable and often preferred to give visual information progressively, over a sequence of graphics, instead of trying to cram it all on one.

### **• Using Too Small Words**

Another of the most common traps is not making the words **big** enough. It sounds too obvious to be worth mentioning, but it is one of the easiest traps in the world to fall into. The trouble is that presenters already **know** what the words are, so they can read them just fine. Moreover, they may wish the words were big enough because it is time consuming to redo a graphic, so they kid themselves the words are perfectly legible. **On top of that, they** may forget how far away the audience may be sitting. Especially with slides, the only safe course is to make the words as big as possible and to keep an active and lively suspicion that they are not big enough.

## ***Choosing the Medium***

In preparing for **an** oral briefing, **we** must determine if **the** material will assume final form as paper handouts, posterboard flip charts, overheads, slides, or screen projections. The choice of medium does impact graphics options.

### **• Paper Handouts and Overheads**

By far the simplest and quickest visual to prepare is a handout which can be easily made into a transparency. Handouts can be in black and white or color. Handouts summarize the main points of your presentation. This is virtually done when you prepare the executive summary of the report. Usually, all that is left is to further simplify the executive summary and add simplified graphics emphasizing the important messages of the report.

A color printer could add impact to your handouts. However, if your office does not have a color printer (e.g., color laserjet) you will have to weigh the benefits of using color against the lead time and cost required to have a graphics shop prepare the handouts.

### • **Posterboard Flip Charts**

Preparing flip *charts* are very similar to preparing color slides. However, since you do not have the printer capable of making large posterboard flip charts, consult the graphics shop. Copies of handouts are adequate to be given to the graphics shop. The shop will turn your black and white handouts into large colorful charts.

### • **Slides**

Slides are very effective in a presentation to a large audience. Simplification is critical to good slides. Bullet your text, keeping the text to only a few words and no more than one line per bullet. Graphs should be simplified to include only that which is essential (e.g., the axes might not be needed).

Slides can be made by the graphics shop or you may choose to do them yourself. If you wish to do them yourself, you must use a software program which supports the slide maker device you will be using. If you do not own a slide maker device, ask around other HHS **offices**. Very likely, the Social Security Administration's regional training center will have one. If you create slides yourself, the cost can be insignificant. It generally involves only the purchase of slide film. However, the learning curve for using the device effectively may be large the first few times. Consequently, you may want to just let the graphics shop handle the production or if time is critical and money is no object, let a slide production service (many graphics shops in your city) produce them.

If you choose to create your own, the following points may assist you:

- Use a graphics program with a built-in slide-aspect ratio. **This** feature will automatically compensate for the differences between the width-to-height ratio of your screen and that of slides.
- Use solid fonts instead of outline ones. Outline text is less readable on a slide. Don't make your text too **skinny**. Slides aren't a good medium for minutiae. Keep headlines at **24** point size or larger. Never use a font smaller than 10 points in the body of the graphic used as a slide.
- Use thick lines. **This** is a corollary of thick fonts. You should stay away from the package's thinnest line widths and never use any line thinner than a 2-point rule.
- **USE** solid colors. Completely filled areas are easier to see than cross-hatched pattern fills.
- **Leave** plenty of **room** on the outside edges of your screen. The same line of text that **fits** precisely on your display screen may run over the edge on a slide. Wide margins will help avoid this problem.
- **USE** a dark background. Dark blue or black **are** the most popular because they **mask** imperfections in the projection screen or slide and permit a sharp contrast between elements. Use light, contrasting **colors**, such as yellow and white, for titles and other important text.



- Take advantage of overlaying techniques. Film recorders will let you place one object in front (or on top) of another. For instance, you *can* superimpose a bar chart on top of a clip art symbol. This technique, however, won't work well on vector devices such as plotters because the plotter ink smears as it overlays.

### • Screen Projections

Screen projections involve the projecting of computer images through an overhead **type** device. This type of presentation is most effective with small audiences (10-20). Since the computer is used, the presentation can take on a considerable degree of automation and visual effects. You will need a projection device such as In **Focus's** LCD projection panel to interface with the computer. LCD panels function much like transparencies but offer the additional advantage of screen shows. The LCD panel sits on the overhead projector and is connected to the computer. The overhead projector then transfers the images to a screen using either CGA, EGA, or VGA resolutions depending on the computer and panel used.

To really take full advantage of the projection panel, you will need a graphics program containing a screen show utility. Most major presentation graphics programs contain a screen show feature (e.g., Harvard, Freelance, and DrawPerfect). **As** with any slide show, you will specify the order in which the slides are presented. Slides are nothing more than a graphics file. The slide show will use the files it creates and will generally accept raster (bit-mapped) files created by other programs. Scanned images are bit-mapped. Files created by screen capture programs are also bit-mapped. **Screen** capture programs are especially valuable when developing training **ms.** For example, if you wanted to include in your presentation a series of slides depicting the screens encountered while working in a software program, you could **capture** ~~each~~ of these screens and **include them**.

While technologies **are** getting better, many panels do not show color very well. If it **is** a color LCD, the colors are usually washed out. Noncolor panels generally project images using a blue or gray color scale. Additionally, CGA or even EGA resolutions are much more blurry and difficult to read than newer VGA panels. Because of these drawbacks, you will need to take special care creating slides to ensure color and shading changes on the panel do not result in the loss of clarity of slides. While the slide show may **look** great on your PC's monitor, the same may not be true of the projected image. Consequently, take special care. If the projection device does not **support color**, set graphics programs used to prepare slides to monochrome displays.

# Graphics Software

Graphical **software** have become so powerful they require little effort to produce quality graphics in a short period of time. Graphics programs provide us with many predefined graphics formats (bars, pie, etc.) from which to choose. Thus, it is a simple matter to fill in the data screens with the requested information. Then, within seconds, you can display the results on your computer's screen or printer.

Graphics programs allow us to easily alter characteristics of a graphic to reveal other subtleties of the data. Most programs even allow us to change from one chart format to another at the touch of a button. **This** allows us to **see** options before we choose the chart which is best. But, what determines which graphic is **best**? **This** guide has attempted to provide information on use of graphics which might help you with this determination. If you have further questions, you might consult books on graphics basics like those referenced in the back of this manual. Interestingly, some answers may be no further away than the "help" key of your graphics package.

**While** graphics programs have proliferated, they have yet to be used as extensively as **possible**. The vast majority of **OEI** reports include few, if any, graphics. Additionally, presentations to **OPDIVs** are usually limited to black-and-white laser-printed hand-outs. Although the graphics shop can produce color slides and poster boards, they generally have been used only for important presentations, when the best impression **was** critical (e.g., the Secretary's briefings).

We should take advantage of the computer products available in our office in order to achieve the most effective inspection report possible. For our word processing needs, **WordPerfect 5.1** is an excellent product offering many features. While it is deficient graphically (e.g., creates only simple graphics such as lines, boxes, text shading, column charts, of text charts), Wordperfect makes up for this by allowing you to import graphics created by other programs. While this may not be the most convenient situation, it does allow you to choose those graphics programs which best meet our needs given budget considerations.

For simplicity, graphics **software** can be classified into three basic categories: paint programs, draw programs, and presentation graphics programs. Although presentation graphics programs are most often used in our day-to-day work, the other program types are important because they can be used to enhance or modify charts. Let's briefly view differences in the individual programs.

## ***Paint Program***

Paint programs are **used** to create pictures from scratch using freehand drawing or touch up scanned images (e.g., photographs). Inexpensive painting programs often provide little more than a simple electronic easel. You are given a blank pad (screen), a palette of shapes, patterns or colors, a brush, and some other artist tools. You simply use the brush by "dipping" it into a color or pattern and **start** spreading **naint over the screen**

Paint programs, which generate pictures out of dots, are enhanced by the addition of user-selectable options to automate the drawing process. With these, the computer takes an active part in making the pictures. The main applications of a painting program are to 1) create **symbols** for pictographs (e.g., a company logo), 2) create pictures for image underlays, 3) edit graphics digitized by a page scanner, or 4) modify a graphic on a dot-by-dot basis. Paint programs store the information as bit map locations. (See Appendix B for further information.)

Although paint programs are valuable for **such** things as editing a scanned image or creating colorful illustrations for slides, they are rarely used in OEI. However, as scanners become widely available to inspection **staff**, their use may increase.

### ***Draw Programs***

Draw programs are more structured than painting programs, although you can often draw the same types of images with both. However, a draw program creates images as a combination of lines, circles, curves, and other geometric shapes rather than dots. Draw programs store information in the form of computer instructions.

Advanced drawing programs are designed for computer-aided design (**CAD**) or some types of artistic design (e.g., advertising). **CAD** programs are not really suited for presentation graphics purposes. On the other hand, artistic programs such as Arts and Letters Editor and Micrografx Designer, with their large collection of ready-made clip art, are useful if we need to create types of graphics not available in traditional presentation graphics programs. These programs, however, are much more difficult to use and very labor intensive. This is because we must construct the graphic entirely from scratch using symbols (e.g., lines, circles, squares) and available clip art.

Draw programs allow considerable control over all aspects of a drawing. For example, the program allows control of the exact size and placement of objects on the screen, providing a set of rulers marked **off** in whatever graduations you desire. The mentioned programs let you zoom in to make **fine adjustments** then zoom back out to finish the graphics picture.

### ***Presentation Graphics Programs***

Business presentation graphics programs are those which have the ability to automatically utilize **data** to produce statistical charts such as pie, bar, and line charts. These programs are what we use most often in OEI.

The flexibility that different presentation graphics packages provide varies. Most programs differ somewhat in the number, type, and appearance of graphics they **can** produce. However, **all** can create simple bar, line, and pie charts. Only more sophisticated programs create specialized charts such as exploded pie charts, histograms, scatter graphs, and many more. A few advanced presentation graphics programs (e.g., Microsoft Chart) are designed to create complex statistical charts, and plot such things as regression lines, modes, means, and moving trends.

Many presentation graphics programs now include simple to moderately sophisticated drawing functions and slide show presentation features. This means that you can add such things **as** arrows, clip *art* **symbols**, etc. to the graphic. Examples include Harvard Graphics, Freelance, and WordPerfect's own DrawPerfect. Because of the addition of **drawing** features and clip art libraries, the line between draw programs and presentation graphics programs has begun to blur.

If your graphics program has little control over graphics enhancing and modifying features such **as** 1) label size and positioning, 2) addition of subtitles, 3) chart positioning on a page, and 4) color palettes, the program (e.g., Lotus Spreadsheet version 2.1 or lower) is primarily for analytical work rather than presentation purposes. The more options a program provides, the more flexible it is, and hence, the more personalized the graphics can be.

Creating graphics are even simpler for those programs which can use a mouse (an electronic pointing device). For some presentation graphics programs and most draw programs, a pointing device, such as a mouse, is required. For those of you who have not used a mouse, you will find that you can navigate through menus and manipulate graphics features with a point-and-click technique.

Many presentation graphics programs may be available for your office use. DrawPerfect and Quattro **Pro** have been made available to each region. Other presentation graphics programs that some regions may have been using might include one or more of the following:

- Microsoft Chart
- charisma
- Lotus Graphwriter II
- Microsoft PowerPoint
- Harvard Graphics
- Lotus Spreadsheet (version 2.3 or higher)
- Lotus Freelance
- Applause II
- CA-Cricket Presents
- Pixie

## References for Further Reading

*Envisioning Information*; Edward R. Tufte; Graphics Press; Cheshire, CT; 1990.

*Say It With Charts*; Gene Zelazny; Dow Jones; Homewood, IL; 1985.

*Statistical Graphics: Design Principles and Practices*; Calvin F. Schmid; John Wiley; New York; 1983.

*The Elements of Graphing Data*; William S. Cleveland; Wadsworth; Monterey, CA; 1985.

*The Visual Display of Quantitative Information*; Edward R. Tufte; Graphics Press; Cheshire, CT; 1983.

## Appendix A: Importing and Manipulating Graphics in WordPerfect

After creating graphics in your graphics package, the next step is to incorporate them into WordPerfect. The following are examples of steps involved in the process of importing graphics and changing them within WordPerfect to meet your needs.

As mentioned earlier, some programs (e.g., Drawperfect WPG extension) produce fdes that are directly importable (you do not have to change the file's format) into WordPerfect. Many other programs (e.g., Harvard Graphics and Lotus Freelance) produce files that must be converted (exported) by the graphics package as a fde type WordPerfect will accept. It is generally best to export the fde as a metafile (CGM extension); however, exporting to files with certain other extensions are acceptable (e.g., PCF, TIF or PIC). If you **will** be printing to a postscript printer, exporting the image as an encapsulated postscript file would generally be the best option (EPS extension).

### Importing a Graphic

The steps shown below add a scanned image called logo.tif into WordPerfect. The fde imported could just have easily have been any graphic fde you selected to import.

**ALT-F9 (Graphics Key)**

**Option 1 (Figure)**

**Option 1 (Create)**

Result: **Graphics definition screen**

Select: **Option 1 (Filename)**

Type: **LOGO.TIF**

Remember to include the file extension and path (sub-directory) when importing or specify, using Shift-F1, the default location of your graphics files. Otherwise, the fde **will** not be found.

Select: **Option 4 (Anchor Type)**

Select: **Option 1 (Paragraph)**

Type: **(Return)**

Type: **(Return)**

Figure A-1: Graphics Definition Screen

Definition: Figure	
1 - Filename	LOGO.TIFF
2 - Contents	Graphic
3 - Caption	
4 - Anchor Type	Paragraph
5 - Vertical Position	0
6 - Horizontal Position	Right
7 - Size	3.25" wide x 3.25" (high)
8 - Wrap Text Around BOX	Yes
9 - Edit	
Selection: 0	

This accepts all of the defaults. The result is a three and onequarter inch **square** figure **box** placed in the upper right hand corner of the page. Use the WordPerfect view document command (Shift-F7)(G) to preview the box. The box should appear

Figure A-2

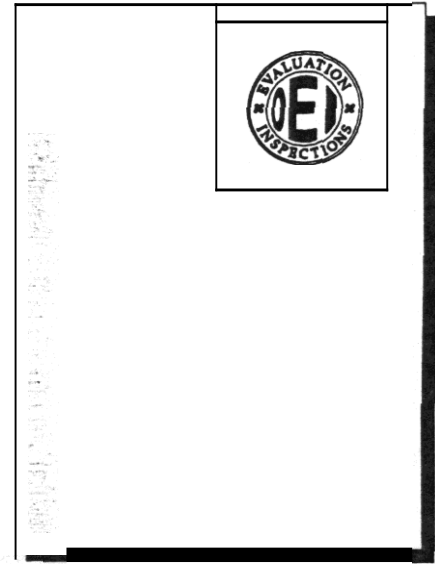
as in Figure A-2 (the image size and shape **will** differ depending on the file you select).

That's it, you've merged text and a graphic!



*Had your cursor been anywhere other than the top of the page the figure would have been placed on the line where the cursor was. The default Horizontal position of a graphic is to the right. Most of the time we need to change the horizontal position (option 6) in the graphics definition screen to "center."*

Another way of positioning graphics is to change the anchor type to "Page." Rather than the figure being placed at the vertical position of the cursor, the figure **will** be placed either at the top, the center or the bottom of the page. Another option allows you to specify the exact vertical position in inches (see below).



### ***Moving a Figure Box***

Suppose you want to change the location of the figure on the page. This can be done by 1) setting the anchor type to paragraph, blocking the figure and moving the graphic to the line where you want the figure to begin (or changing the vertical position "offset" location from the line where the figure is located), or 2) manipulating the options such as vertical and **horizontal** position when the anchor type is "Page." Using **this** figure, **try** the following to move its position after the "Page" vertical position is selected:

Type: *ALT-F9 (Graphics)*  
 Select: *Option 1 (Figure)*  
 Select: *Option 2 (Edit)*

Result: *Figure Number? 2 (or one number higher than the last box created)*

Type: *1*  
 Type: *(Return)*

Result: *The original Figure definition screen appears*

Select: *Option 4 (Anchor Type)*  
 Select: *Option 1 (Page)*

Result: *The anchor type is changed from paragraph to page*

### **• Lowering the Box on the Page**

Select: *Option 5 (Vertical position)*

**Figure A-3**

**Result:** *You'll be offered the following options:*

*option 1 (Full Page)  
option 2 (Top)  
option 3 (Center)  
option 4 (Bottom)  
option 5 [Set Position]*

**Result:** *Offset from top of page 1.16'*

**Type:** *3*

**Type:** *Return*

**Result:** *The graphics box is moved 3 inches down from the top of the page. [See Figure A-3]*

**Type:** *(Return)*

**Type:** *(Return)*

**This returns you to the editing screen and you can use view document (Shift-F7)(6) to preview your page.**

• **Moving the Box to the Left**

**Type:** *ALT-F9 [Graphics]*

**Select:** *option 1 (Figure)*

**Select:** *option 2 (Edit)*

**Result:** *Figure 2*

**Type:** *1*

**Type:** *(Return)*

**Select:** *option 6 (Horizontal Position)*

**Result:** *You'll be offered the following choices.*

*Option 1 (Margins)  
option 2 [Columns]  
option 3 [Set position]*

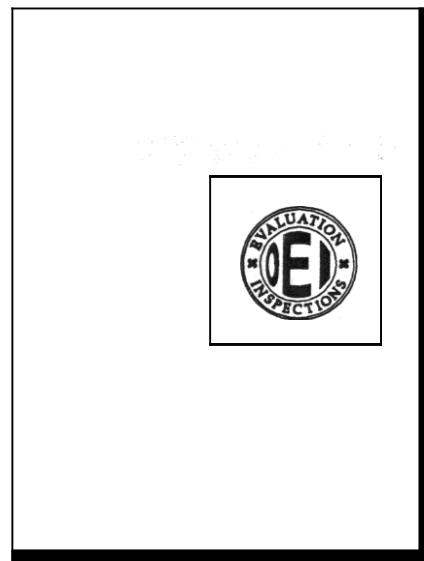
**Select:** *option 3 (Set position)*

**Result:** *Offset from left of page: 0"*

**Type:** *3*

**Type:** *(Return)(Return)*

**The logo is now 3 inches from the left hand border of the page. The ability to align boxes with borders of page or column makes it easy to control the appearance of the**





## Resizing Figure Boxes

It's just as easy to size a box as it was to move it.

Type: *ALT-F9* [Graphics]

Select *Option 1* (Figure)

Select: *Option 2* (Edit)

Result: *Figure 2*

Type: *1*

Type: *(Return)*

Select *Option 7* (size)

Result: *You're presented with four options:*

*Option 1 Set Width/Auto Height*

*Option 2 Set Height/Auto Width*

*Option 3 Set Both*

*Option 4 Auto Both*

*If you choose Option 1 [width, auto height] the height of the box will automatically be made proportionate to the width of the graphics file being placed.*

*Option 2 makes the width of box proportionate to the height of graphics file.*

*Option 3 offers maximum flexibility but must be used with care. Since you will specify the dimensions, proportionality is often lost. Do not use this option unless there is a need to distort the image.*

### • Increasing Box Width

Try the following to make the box wider, but maintain correct proportions:

Select: *Option 1* (Width/Auto Height)

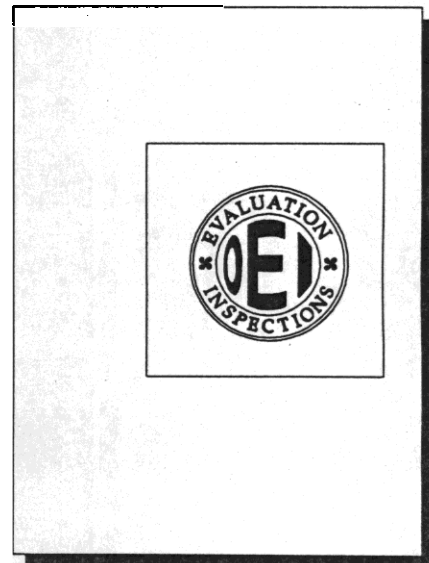
Result: *Width = 3.25"*

Type: *5*

Type: *(Return)*

Result: *Since the logo file is a square, the height also is made 5 inches. [See Figure A-4.] If the original logo had been rectangular, the height would increase by an amount proportionate to the width.*

Figure A-4



• **Decreasing Box Height**

Select: *Option 7 (Size)*

Select: *Option 2 (Height/Auto Width)*

Result: *Height = 5"*

Type: *2*

Type: *(Return)*

Result: *Notice how the width is reduced to 2 inches, again maintaining the correct proportions of the square graphic. (See Figure A-5.)*

Now create a rectangular box for the square graphic.

Select: *Option 7 (Size)*

Select: *option 3 (Both)*

Result: *Width = 2"*

Type: *5*

Type: *(Return)*

Result: *Height = 2"*

Type: *4*

Type: *(Return)*

If you view the document, the logo will be centered in the box and stretched horizontally.

**Moving Graphics Inside Boxes**

it's a simple matter to move the image (crop) inside the box.

Type: *ALT-F9 (Graphics)*

Select: *Option 1 (Figure)*

Select: *Option 2 (Edit)*

Result: *Figure 2*

Type: *1*

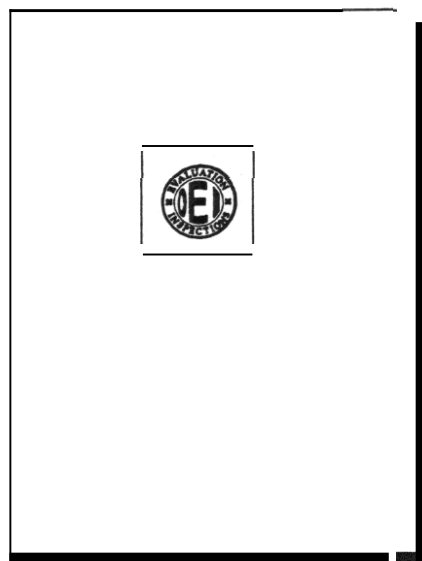
Type: *(Return)*

Select: *Option 9 (Edit)*

Result: *Figure 1, with logo image appears on the screen.*

Type: *Left cursor control key.*

**Figure A-5**



**Result:** *Each time you bit the left cursor control key, the logo will move slightly to the left. This shifts the percentage in the lower right band corner of the screen. (10 percent is the default.)*

**Type:** *(Insert) Options are 1, 5, 10 or 25 percent displacement.*

**To move the image a set distance.**

**Select** 1 (Move)

**Result:** *Horizontal = 1"*

**Type** 2

**Type:** (Return)(Return)

This moves the logo 2 inches to the right. (See Figure A-6.) Enter a negative number (e.g. -2) to move to the left.

**Select:** 1 (Move)

**Result:** *Horizontal = 2"*

**Type:** -2

**Type:** (Return)

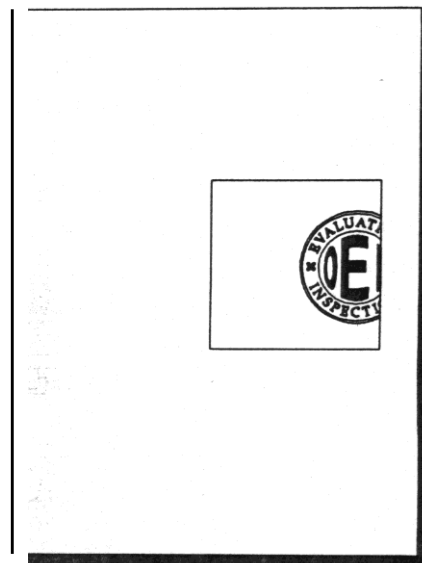
**Result:** *Vertical = 1"*

**Type** 1.5

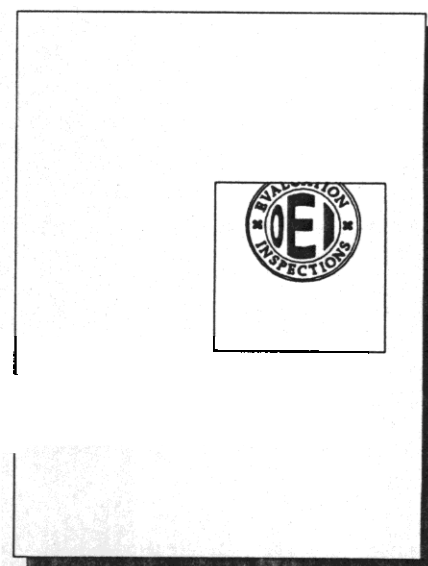
**Type** (Return)

This moves the logo one & one-half inches higher in the box. (See Figure A-7.) If you want to lower it, enter a negative number (e.g. -1.5).

**Figure A-6**



**Figure A-7**



### ***Resizing Graphics Images Within Boxes***

Simply by pressing (Page Up) or (Page Down) **you** can change the **size** of the image in the box.

Type: *(Insert)*

Again this increases or decreases the image **by 1, 5, 10** or **25 percent**. Increasing the image **by 25 percent** changes the image as shown in Figure A-8.

### ***Rotating Graphics Images***

To rotate the logo to the left, hit the **(-) key**. To rotate to the right, hit the **(+) key**. Once again, **you** can hit the **(Insert) key** and toggle 1, 5, 10, and **25 percent** rotation.

Select: *Option 3 (Rotate)*

Result: *Enter number of deg m (0-360)*

Type: *90*

Type: *(Return)*

Result: *Mirror Image? (Y/N) No*

Type: *(Return)*

Result: *The logo is rotated 90 degm to the left. (See Figure A-9.1)*

### ***Changing Borders***

Type: *ALT-F9 (Graphics)*

Select: *Option 1 (Figure)*

Select: *Option 4 (Options)*

Result: *You've represented the Figure box options menu*

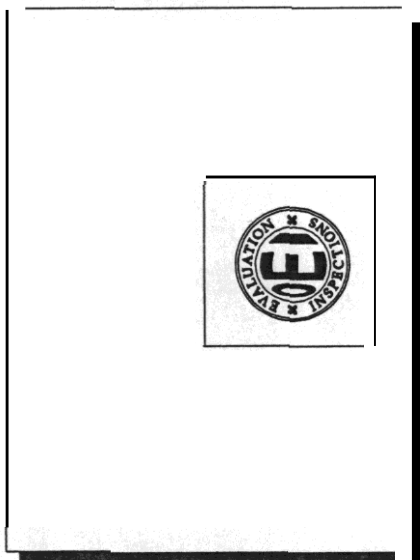
Select: *Option 1 (Border Style)*

Select: *Option 7 (Extra Thick) four times*

**Figure A-8**



**A-9**

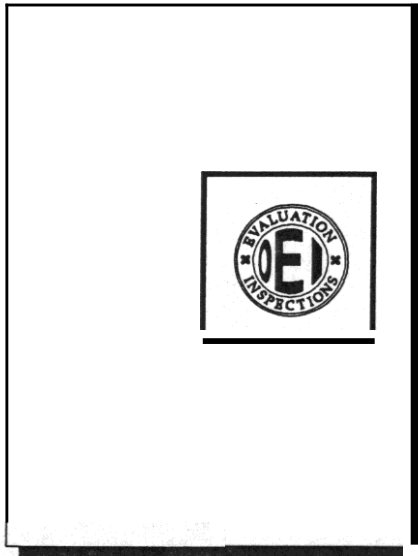


**Result:** *This replaces the single line border with an extra thick border. [See Figure A-10.]*

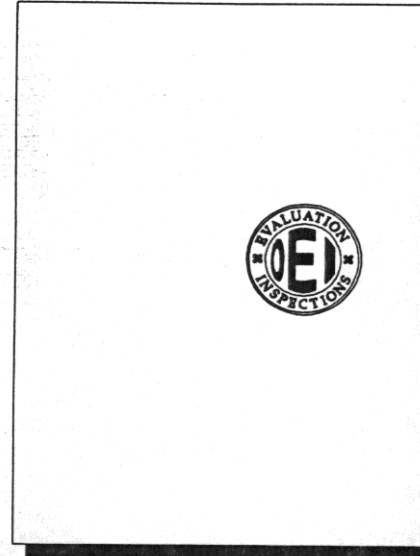
**Select:** *Option 1 (No) four times.*

**Result** *The border disappears. (See Figure A-11.)*

**Figure A-10**



**Figure A-11**

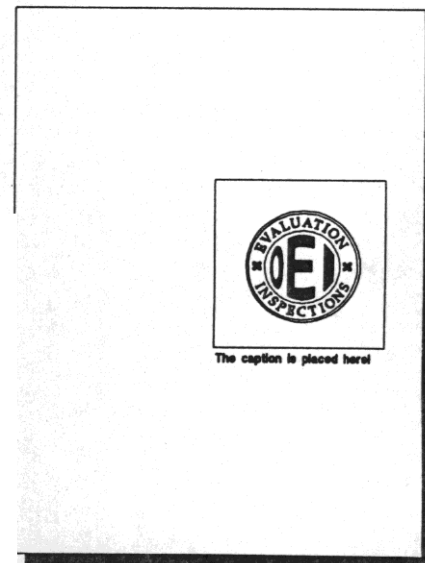


## Placing Captions

**Type:** *ALT-F9*  
**Select** *Option 1 (Figure)*  
**Select:** *Option 4 [Options]*  
**Select** *Option 7 (Position of Caption)*  
**Select:** *Option 1 [Below Box]*  
**Select:** *Option 1 [Outside of Border]*

**Result:** *The caption is placed below the box. [See Figure 4-12.] If you had selected (Above Box) the caption would have been placed above the box. Using the caption to place the title of the graphic along with the figure box reference works very well. Placing the title in the caption box, rather than including the title in the graphics program prior to exporting the file, provides consistency (e.g., titlefont and size) and provides more flexibility if you need to size the graphic. Specifically, if the title is a part of the imported graphic, it will increase or decrease in size as the graphic is sized. As a consequence, title sizes can quickly begin to vary in size from graphic to graphic within a report. Varying title sizes are not desirable.*

**Figure A-12**



# Appendix B: Graphics Files and Formats

## *Graphics File Compatibility With WordPerfect*

File incompatibility is a problem faced by anyone who **wants** to merge/incorporate graphics produced in one graphics package with another graphics package or a word processor (in our case, WordPerfect 5.1). Prior to Wordperfect 5.0, we were unable to incorporate graphics into our text documents created with WordPerfect 4.2. Our only alternative was to cut and paste a copy of the graphic onto the hardcopy document after printing or to purchase a utility program such as INSET by INSET Systems which could merge graphs and word processor files at the time of printing.

With WordPerfect we have a program which will incorporate graphs via the ALT-F9 keys. **Is** it true we no longer have to cut and paste or buy other programs to achieve graphics and text merging? The answer **is** largely yes. However, it depends upon what graphics package produced the graphic, what file formats the graphics package can export, what changes *occur* in the file image as it is exported from the graphics package and then imported into Wordperfect 5.1, and finally what quality of graphics image you are willing to accept.

Graphs produced directly **by** a graphics package to a printer such as a Laserjet or Postscript printer are usually of high quality. Even graphs produced by dot matrix printers **are** good although they do not usually reproduce on a copy machine as well as output from a laserjet. However, the same graphic imported into Wordperfect 5.1 may be totally unacceptable. Rarely does anything come without a cost. The cost for us in importing a graphic is the output may not be of the same quality as we can get from cutting and pasting the original into the document. This is not to say that programs cannot export files that produce good, if not the same quality, of result as the graphics program itself produced. DrawPerfect works very well with WordPerfect.

The question that you must be asking is why shouldn't any exported file **look** just as good produced in Wordperfect as it looks directly from any graphics package. The answer is technical. There are so many makers of graphics programs, word processors and desktop publishing programs. While there are several American National Standards Institute (ANSI) standards, like many laws, these have been more honored in the breach than in the observance. Quite simply, every software vendor believes that he or she knows best about how graphics should be done in a particular application. There is no market leader in graphics that everyone else will fall in line with. Certain formats, like PC PaintBrush's PCX and 1-2-3's PIC, have become popular, but they're not standards in the same way that **Lotus's** WK1 is for spreadsheets or Ashton-Tate's DBF for databases.

Wordperfect can import the following formats directly with no changes. A partial list of file extensions (see WordPerfect documentation for full list): cgm, eps, pic, pcx, tif, wpg (WordPerfect's own graphics extension). Some programs, such as paint

programs, and only one presentation graphics program (e.g., Drawperfect), produce files in a format that WordPerfect can import directly without the graphics program having first gone through the process of exporting the file (exporting is not the same as just saving a file). Virtually all presentation graphics programs have the ability to export a graphics file in a format(s) acceptable to WordPerfect. However, you may notice that the imported version of the graphic looks a little different. The shading patterns have changed and the typeface of the labels and title are different. Using different printer drivers can have differing results (example, using the driver for a plotter as the output device before exporting the file and importing into WordPerfect). You must experiment to find the best results.

Only Drawperfect produces files with WordPerfect's graphics file extension (wpg). Since WordPerfect developed Drawperfect, it is no wonder it suffers few or none of the distortions of graphics imported into WordPerfect from other graphics programs. For this reason alone, Drawperfect is worth your consideration when creating graphics.

Some other programs (e.g., Harvard Graphics) may even require that a special driver be installed in the computer's config.sys file prior to the generation of the exported file. The driver is required to allow the metafile created to retain all of the characteristics (e.g., font type) of the graphic as viewed in Harvard Graphics.

### ***Raster and Vector Graphics***

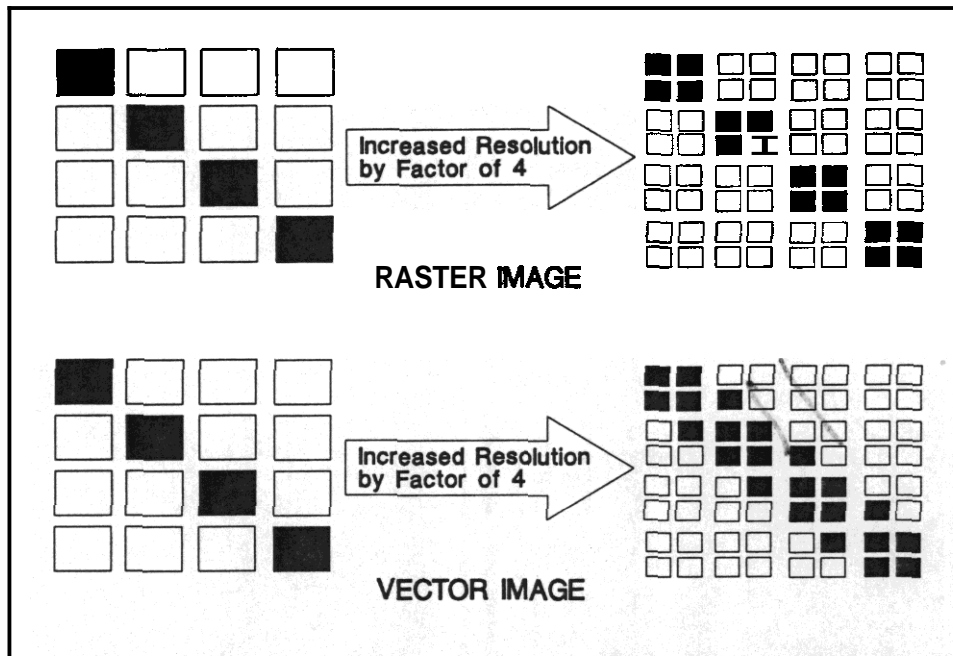
The two basic types of graphics file formats are known as raster (more commonly called bit mapped) and vector (or object based). Each is used for different types of graphics. A bit map uses one bit of computer memory (or more if shading or color) to store a black or white dot. Such a method **limits** the resolution of the drawing to the **limitations** of the computer's memory. To illustrate **this** limitation: a full page of bit map drawing at 300 dots per square inch (dpi) would require over one megabyte of memory. Consequently, most commercial paint programs use the resolution of the computer screen which results in poor quality when printed on a LaserJet at 300 dpi.

Draw programs, on the other hand, print at the highest resolution of the output device (LaserJet) regardless of the screen resolution. That's why you can produce beautiful graphs using a low resolution CGA monitor even though it looks terrible on the screen when viewing the graph.

Paint programs, screen capture programs and scanners produce files in a raster format. Examples are PC Paintbrush and Windows Paint. Raster images can be described as a series of pixels or dots. On the other hand, vector images are stored as a list of drawing instructions describing individual objects. Postscript (.EPS extension) are unique. The images are stored in the postscript language and thus can only be printed on a postscript printer. The language is more complex than a simple vector list of instructions.

The great advantage of vector graphics over raster is that **vector** graphics can be sized without loss of resolution, lines are smaller and objects **are** treated individually. **An** explanation of resolution follows. Imagine if you increase the resolution of your LaserJet (dots per inch), or computer screen (pixels per inch) by a factor of 4. Wouldn't the drawing you did in PC Paintbrush look or print with more resolution (smoothness of **lies**)? The answer is "no." The following illustrates why. Notice how the resolution of the image (blackened squares) does not get better for raster images while vector images do get better.

Figure B-1



Raster (paint **type**) images offer less **latitude** for **image enlargement or reduction**. When the images **are** reduced in size, the dots become too close to each other and detail is lost. Likewise, enlargement can cause **an** image to break apart, because the dots defining the image **are** moved further apart.

The fact that vector programs store objects like lines **as individual objects**, **allows** you to manipulate (rotate, flip, move, size) the object easily. All that is involved is altering the information (e.g., specifying the line: start point, stop point, width, etc.). This is not the case **with** an image created with a paint program. Since the image is **made** up of **individual pixels (dots)**, every dot must be altered individually. **You** must settle for painting **portions** of the image back to white (**or** whatever color) and starting over.